

TRANSPARENT CONDUCTIVE OXIDES FOR PLASTIC FLAT PANEL DISPLAYS

5 ABSTRACT

The present invention employs lightweight, flexible, plastic substrates for constructing flat panel displays, packaging materials and electro luminescence lamps. The display medium must be protected from oxygen and moisture in order to avoid degradation. In the present invention, at least one layer with barrier and electrode characteristics is deposited over the substrate that has both a low enough resistivity to function as an electrode for the display and low oxygen and moisture permeability. If lower permeability and/or higher conductivity is required, multiple alternating layers of barrier materials and conductive materials can be applied. The barrier material includes a thin metallic film, an organic polymer, a thin transparent dielectric, and a thin transparent conductive oxide. The conductive material includes a thin transparent conductive oxide, a thin transparent metallic film, and/or a metal nitride. Preferably there is a Polymer Multi Layer (PML) processed base coat deposited over the substrate. The base coat produces substrate smoothing, and more importantly, in combination with another layer, the base coat has vapor barrier properties. In the preferred embodiment, a PML processed top coat barrier layer is deposited before the coating contacts a surface, such as a roller. The PML processed top coat excludes moisture and atmospheric gases that chemically degrade the device performance.

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